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Motivational "Contagion" Between Squad Leaders and Their Squad Members

Joel M. Savell, Ross C. Teague, and Trueman R. Tremble, Jr.
U.S. Army Research Institute

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13. ABSTRACT *(Maximum 200 words)*

Forty-nine Army squad leaders (SLs) and their squad members (SMs) provided self-report measures of their job involvement, both before and after a three-to-four-month "train-up," during which time the units prepared for a major field combat exercise. Using these self-report repeated-measure data, we tested a "motivational contagion" hypothesis -- viz., that SMs and their SL influence one another with regard to their job-involvement. The results of the analysis indicated that job-involvement scores of SLs are indeed correlated with the job-involvement scores of the SMs of these SLs, and that the strength of the correlation varies directly with the length of the SM-SL relationship. Also, SM's ratings of their SL's overall leadership ability predicted the magnitude of the SM-SL correlation. Examination of SM and SL scores at Time 1 and Time 2 suggests that influence may have been operating in both directions. Finally, overall mean job-involvement was slightly (but reliably) lower at Time 2 than at Time 1, both for SMs and for SLs.

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Motivational "Contagion" Between Squad Leaders and Their Squad Members

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FOREWORD

This report presents the results of an analysis of data collected by the U.S. Army Research Institute for the Behavioral and Social Sciences during a multiyear effort to identify determinants of small unit performance in field training exercises such as those held at the National Training Center (NTC) and the Joint Readiness Training Center (JRTC).

The research reported here focused on two of these determinants, leadership and motivation, and the relationship between them. Taking a particular relationship (the relationship between squad leaders and their squad members) and a particular kind of motivation (job involvement or conscientiousness about one's work), the research investigated the question of whether, in the process of working together over a period of time, squad members become more similar to their squad leader (or vice versa) in their degree of commitment to or involvement in their jobs.

This effort was part of the "Determinants of Small Unit Performance" Task, conducted by the Leadership and Motivation Technical Area (LMTA) of the Training Research Laboratory (TRL), now incorporated into the Leadership and Organizational Change Technical Area of the Manpower and Personnel Research Division. The effort was supported by a memorandum of agreement ("Program of Research in Support of the Center for Army Leadership") dated 15 November 1990. The results of the effort were briefed to the Center for Army Leadership and its branch chiefs in August 1991.

EDGAR M. JOHNSON
Technical Director

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MOTIVATIONAL "CONTAGION" BETWEEN SQUAD LEADERS AND THEIR SQUAD MEMBERS

EXECUTIVE SUMMARY

Requirement:

This research investigated the kind of motivation or job involvement that leads many individuals, when carrying out an assignment, to give of themselves in ways that go beyond normal expectations. The following hypotheses were evaluated:

(a) self-reported job involvement scores of squad leaders and their squad members are positively correlated;

(b) the magnitude of this correlation increases over time; and

(c) squad members change more than their squad leaders.

Procedure:

The research analyzed existing data obtained from the "determinants project." In that project, objective-response questionnaires were administered to infantry soldiers in the ranks of squad member (SM), squad leader (SL), platoon sergeant (PSGT), and platoon leader (PL). The questionnaires were administered near the beginning (time 1) and again at the end (time 2) of a 3- to 4-month train-up period during which units prepared for a field combat exercise to be held at one of the Army's combat training centers (CTCs).

Based on responses to these questionnaires, a sample consisting of 753 individuals who have provided data both at time 1 and at time 2 was constructed. The analysis reported here is based on repeated-measure data from a subsample of these individuals: 190 SMs (distributed across 49 squads) and their 49 SLs.

One set of items asked respondents how much they agreed or disagreed with each of four statements concerning their job involvement. Examples are "I work hard and try to do as good a job as possible" and "I look forward to coming to work every day." Following each statement was a 5-point scale ranging from "strongly disagree" to "strongly agree," and respondents were given scores indicating their mean agreement/disagreement with the four items. Within each squad, SM scores were averaged to provide a mean job involvement score for that squad; these squad

means were correlated with the individual job involvement scores of the corresponding SLs.

Findings:

(1) Job Involvement scores for SMs and their SL were positively correlated; the longer the SMs and their SL had been together in the SM-SL relationship, the higher the correlation between their job involvement scores. (2) This influence (or "contagion") with respect to job involvement scores, while perhaps present earlier, was not statistically reliable until the 10th or 13th month of SM-SL interaction. (3) SLs who were described by their subordinates as conscientious in carrying out their tasks, as someone in whom they would have confidence if they were in combat together, as someone who pulled his share of the load in the field, as someone who was an effective leader--these SLs were more likely than other SLs to have job involvement scores similar to the job involvement scores of their SMs. (4) Analysis of change over the train-up period indicated that the influence (or contagion) may have operated in both directions.

The overall movement of scores during the train-up period was downward, both for the SMs and the SLs. Such change is a little surprising since soldiers were preparing for an important, highly-job-relevant event (the upcoming CTC exercise); under normal circumstances one would expect them to become more motivated during this preparation period--not less. The lowering of overall mean scores at time 2 is, however, a common occurrence in repeated-measure situations where (as here) the mean of the time-1 measures is above the midpoint of the measurement scale and where (as in virtually all human measurements) the reliability of the measuring instrument is less than 1.0.

Utilization of Findings:

This research demonstrates the importance of having positively motivated SLs and provides a basis for initiating actions to enhance this motivation.

MOTIVATIONAL "CONTAGION" BETWEEN SQUAD LEADERS AND THEIR SQUAD MEMBERS

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MOTIVATIONAL "CONTAGION" BETWEEN SQUAD LEADERS AND THEIR SQUAD MEMBERS

INTRODUCTION

The Problem

The Army attaches great importance to soldier motivation. The basic manual on leadership, FM 22-100 (HQ Department of the Army, 1990, Chapter 7), identifies "providing motivation" as one of the three primary functions of an Army leader, and the other two functions, "providing purpose" and "providing direction", can (depending on how they are performed) serve to enhance the motivation that subordinates have brought to the situation.[1] In other words, the functions of a leader, as articulated in Army doctrine, are either explicitly or (at least in practice) implicitly motivational.

This same manual also lists nine "competencies" (cf McClelland, 1973; also see Sternberg and Kolligan, 1990) that are said to characterize the effective leader--competencies with respect to communication, supervision, teaching & counseling, soldier-team development, technical and tactical matters, decision-making, planning, use of available systems, and professional ethics. These competencies have not been extensively elaborated with respect to their implications for motivation (cf the Army's manual of common tasks for lieutenants and captains (HQ Department of the Army, 1991), but such implications are certainly present and are capable of being elaborated. Take, for example, communication. The way leaders communicate to their subordinates about a task affects the way these subordinates view the task and, in consequence, their willingness--their motivation--to give of themselves in performing it (Bass, 1985; Conger, 1989).[2]

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[1] Over the years there have been a number of efforts to relate leadership and subordinate motivation: Berlew, 1974; Evans, 1970; Kellett, 1952; McGregor, 1966; Michaelson, 1951; Oldham, 1976; Posadakoff, MacKenzie, Moorman, & Fetter, 1990; Sconyers, 1987; Staw & Boettger, 1990; Tetrick, 1989; Weiss, 1977); and Bass (1991, pp. 359-361) cites a number of others. For the most part, however, these efforts have been largely ad hoc and unsystematic. The relationship between leadership and subordinate motivation (at least as far as systematic research aimed at genuinely understanding this relationship is concerned) is largely unexplored.

[2] The leader-subordinate relationship is complex in that a lot of factors affect it (and affect it in different ways). An illustration of this complexity is provided by Conger and Kanungo (1988, pp. 324-333), who identify six classes of variables affecting the leader-subordinate relationship. Other (sometimes cross-cutting) variables are discussed in a paper by House, R.H., Howell, J., Shamir, B., Smith, B., & Spangler, W.D. (1991).

But while nearly everyone agrees that soldier motivation needs to be high (or high enough to perform the mission effectively), this level of motivation is not always found. For example, in a recent series of field combat exercises (Lawrence, 1992) soldier motivation accounted for 42% of the variance in how well the units were judged to have performed in the exercise. These same measures, however, indicated also that many of the soldiers were no more than lukewarm about the work they were doing.[3] Near the beginning of the period only a third said they looked forward to coming to work each day, and several months later (just before going to the exercise site) the figure was down to a fourth. When asked if they felt "very personally involved" in the work they were doing, only half said yes; when asked whether it really mattered to them that they do well in the exercise, nearly half said no or gave a neutral response.

Not all responses of course were of this sort. In some units almost everyone agreed with the (positive-motivation) statements in the questionnaire. There were some units in which motivation was readily aroused and maintained and other units in which this was not the case. What is not clear--and this is a critical question needing systematic research--is what distinguishes these two sets of units from each other. What is it exactly that leaders in one set of units do that leaders in the other set of units do not do? The answer presumably lies in the way these two sets of leaders perform the several leadership functions, the way they exercise the various leadership "competencies." What needs to be determined, however, is just what it is in the leaders' performing of these functions, in the leaders' exercising of these competencies, that makes a difference. The present research is a first step toward answering some of these questions.

Research Objectives

The objective of the present effort was to provide evidence on the effects of what seemed a likely source of the soldier's motivation--viz., the motivation of the individual who served as the leader of the group to which the soldier belonged (cf Blades, 1986, p. 98). We wanted to find out (simply as a starting point and without getting into the dynamics involved) whether self-reported motivation of soldiers co-varies with self-reported

[3] This and similar statements immediately following are based on the authors' analyses of other data from this exercise.

motivation of the soldiers' leaders (see Blades, 1986)[4]. In carrying out this effort we focused on a single leader-subordinate relationship (the relationship of squad members and their squad leader) and just one kind of motivation (job involvement or conscientiousness).[5] The question we asked about this relationship was whether, in the process of working together over a period of time, SMs and their SL become more similar in their degree of commitment or involvement in their jobs. If the answer was yes, we would ask the additional question (though the data available to be applied to this question were extremely limited) whether it was mainly the SMs or their SL who did the changing. These were the hypotheses:

a. Self-reported job involvement scores of SMs and their SLs are positively correlated;

b. The magnitude of this correlation increases over time; and

c. SMs change more than their SLs.

There is good reason to expect unit member job involvement to be affected by the job involvement of the unit's leader (as well as the reverse--cf Blades, 1986, p. 63). One of the best-established principles of social psychology (Festinger, Schachter, & Back, 1950; Homans, 1959; Katz & Lazarsfeld, 1955; Lindzey & Aronson, 1968; Sherif, 1931; Watson, 1966) is that interaction and similarity are positively correlated: People who are similar tend to interact more, and people who interact more tend to become more similar (Homans, 1950; Newcomb, 1961).[6] In other words, when people interact (particularly when the

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[4] Blades (1986, p. 63) reported a correlation of .57 ($p<.001$) between leader and subordinate motivation. Unfortunately, Blades' measures of the two variables were not independent. Subordinates were asked to gauge their own motivation and also to gauge the motivation of their leader (mess steward).

[5] Job involvement is discussed here as an aspect of soldier motivation. It can, however, be conceptualized in a way that distinguishes it from motivation (cf Lodahl & Kejner, 1965). Future research on interpersonal influences on job involvement will want to clarify the relationship between these two variables.

[6] The statement by Homans (1950) is illustrative: "The more frequently persons interact with one another, the more alike in some respects both their activities and their sentiments tend to become. Moreover, the more a person's activities and sentiments resemble those of others, the more likely it is that interaction between him and these others will increase." (p. 120)

interaction extends over a significant period of time), the result is usually an increased similarity between/among the interacting individuals (Brock, 1965; Savell, 1969). There are theories and quasi-theories as to why this should be so (Homans, 1950, 1961; Kelman, 1957; Newcomb, 1961; Savell, 1971); but in each case there is an implication that time is an important factor, that the relevant processes require a certain amount of time to operate, and that (perhaps up to some maximum) the longer the processes are able to operate, the stronger the effect will be.

For the most part, relevant research has been conducted with individuals whose interactions have mainly been with peers. Exceptions have been relationships such as students interacting with their teachers, parents interacting with their children, and husbands and their wives interacting with each other, rather than appointed leaders interacting with their assigned subordinates in a formal organization. And it is not yet clear to what extent and in what way the usual interpersonal influence processes operate when the situation is as structured as it is in a military TOE unit.[7]

As indicated above, the kind of motivation investigated was the kind of psychological involvement in one's job that underlies what Bass (1985) has called "performance beyond expectations". This kind of involvement in one's job is difficult to explain in simple instrumental terms, as a means to some end. People don't ordinarily say: "I am giving of myself <u>in order to</u>. . ." or "I am giving of myself <u>because, if I don't</u>, thus-and-so will happen". In this respect, job involvement is similar to "conscientiousness", which has recently emerged as one of the so-called "big five" in contemporary personality research (Cortina, Doherty, Schmitt, Laufman, & Smith, 1992; Digman, 1990; John, 1990). It is worth noting in this connection that a recent meta-analysis (Barrick & Mount, 1991) found conscientiousness to be a better predictor of job performance than any of the other characteristics examined, showing performance-enhancement effects in all the jobs and in all the work settings studied. This kind of job involvement is also similar to the concept "commitment to the task", which another meta-analysis (Mullen and Copper, in press) found to be the element in unit cohesion that best predicted unit performance. An implication of the Barrick and Mount (1991) study is that appropriately-designed research could identify leader-subordinate relationships in which this kind of job involvement is likely to develop as well as things leaders could do to enhance this development.

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[7] TOE ("table of organization and equipment") units are the kind of units (squads, platoons, companies) one usually thinks of in connection with the Army, and these units consist only of soldiers--i.e., there are no civilians in them.

METHOD

Nature and Source of Data

The research reported here is a secondary analysis[8] of data the Army collected in 1989-90 as part of its "determinants project" (see Tremble & Alderks, 1992).[9] The data are from a sample of 49 Army squad leaders (SLs) and their 190 squad members (SMs) who were assigned together during a three-to-four-month "train-up" designed to prepare them and their units for a major field combat exercise. These SMs and SLs completed a quesionnaire near the beginning (Time 1) and at the end (Time 2) of the train-up period.[10] Squad ns ranged from 2 to 6, with a mean of 3.9. (Additional information about the nature and source of these data is provided in Appendix A.)

Measures

Job involvement. The primary measure was a 4-item Likert job-involvement scale that had been included in both the SM and the

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[8] According to Herbert Hyman (1973) the term "secondary analysis" refers to "the extraction of knowledge on topics other than those which were the focus of the original surveys" (p. 1). The "determinants" effort sought information about the effects of "people-type" factors (e.g., leadership, motivation, and cohesion) on how well small combat units perform their mission, and questionnaires were designed to obtain this information. The question for the determinants effort therefore was whether variables such as leadership, motivation, and cohesion affect unit performance rather than whether these variables affect each other. In order to determine whether (and, if so, how) various aspects of leadership affect subordinate motivation, the researcher would have to construct operationalizations of the various elements of the motivation construct (the energizing, directing, sustaining, and stopping of behavior) and examine the effects of various leadership behaviors on each of these elements. Since relatively little of this is included in the available data, the results of the present effort will necessarily be partial and tentative.

[9] A single report that sets forth (or summarizes) the results of the Determinants project as a whole has not been written. The indicated reports address the nature and quality of the measuring instruments used in the project (Tremble and Alderks, 1992) or some measured relationships among several variables (Siebold, 1992).

[10] A third data collection was carried out shortly after the unit returned from the CTC (and after performance evaluations had been given to unit members and their leaders). The questionnaire discussed in the present report, however, was not administered on this third occasion; and the data obtained on that occasion are not considered here.

SL versions of the questionnaire. The four items making up the scale are shown in Table 1. For each item in the scale there were five response alternatives, ranging from "Strongly Disagree" (1) to "Strongly Agree" (5). Based on these four items, two kinds of scores were computed: a score for the SL and a score for the (combined) SMs in the SL's squad. The score for the individual SL was simply the arithmetic mean of the SL's responses to the four items; the score for combined SMs in the

Table 1.
Job Involvement Scale

Job Involvement Scale

1. I don't mind taking on extra duties and responsibilities in my work with this platoon.
2. I work hard and try to do as good a job as possible.
3. I look forward to coming to work every day.
4. I am very personally involved in my work.

Note. Each item had five response alternatives, ranging from "Strongly Disagree" to "Strongly Agree".

SL's squad was the mean of the individual SM means. Cronbach alpha for the scale was .78 ($p<.001$) in the case of SMs and .74 ($p<.001$) in the case of SLs. "Repeated-measure" (i.e., Time-1/Time-2) correlations were .72 ($p<.001$) for SMs and .75 ($p<.001$) for SLs. The measures of primary interest were not the measures of (SM and SL) job involvement per se but rather the correlation of these two measures with each other.

SM time with SL (TSL). The variable used for predicting SM-SL correlations was the length of time SMs and their SL had been together in the SM-SL relationship. There were two measures of this variable, one indirect and the other direct. As indicated above, a questionnaire containing the job involvement scale was administered twice to all participants, just before the train-up period began and at its completion. The questionnaires were administered approximately 3 1/2 months apart, which meant that SLs and their SMs had been together approximately 3 1/2 months

longer at Time 2 than at Time 1. Thus the "time-of-questionnaire-administration" variable (which itself has no intrinsic interest) was an indirect, "repeated-measure" indicator of the relative length of time SMs and their SL had been together (which is a variable of considerable interest).

In addition to the indirect measure of the length of time the SMs and their SL had been together, there was a more direct measure. This measure was the number of months SMs said they and their SL had been together in the SM-SL relationship; and the data from this measure were recorded separately at Time 1 and at Time 2.[11] The questionnaire item used for this purpose was included in the SM version of the questionnaire and is reproduced below:

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[11] It should be noted that there are two kinds of comparisons here, and the difference between them is important. The first is the comparison between SM-SL correlations at Time 1 and the corresponding correlations (involving the same individuals) at Time 2. With these "repeated-measure" correlations one can inspect the two coefficients to determine whether one is larger than the other, and one can compute the statistical significance of each correlation separately. For this kind of comparison, a sampling distribution of differences between the two correlations seems not to have been constructed; and the relevant table of probabilities is not available. In other words, short of getting a computer and generating one's own sampling distributions (which didn't really seem necessary at the here) there appears at present to be no way of assessing the statistical significance of differences between paired correlations of this type. The second kind of comparison is the comparison between SM-SL correlations from one set of paired individuals (e.g., SLs and their SMs who have been together a relatively short period of time) and the corresponding correlations from another set of paired individuals (e.g., SLs and their SMs who have been together a longer period of time), with both correlations computed on data obtained at approximately the same time (i.e., at Time 1 or at Time 2). With these correlations one can, in addition to estimating the statistical reliability of each correlation separately, compute an estimate of the difference between the two correlations--something, as indicated above, that cannot be done with the "repeated-measure" correlations. Because of this difference between the two kinds of comparisons, in the present report we use procedures that are usable with either comparison--that is, a comparison involving visual inspection of the correlations' relative magnitude as well as a computation of statistical significance for each correlation separately.

"How long has your present squad leader been your squad leader?"

A. 0-3 months	F. 20-23 months
B. 4-7 months	G. 24-27 months
C. 8-11 months	H. 28-31 months
D. 12-15 months	I. 32-35 months
E. 16-19 months	J. 36 or more months

For purposes of computation, the response alternatives (intervals) were viewed as forming a 10-step (A-J) scale; and respondents (SMs) were assumed to have been together with their SL the number of months indicated by the midpoint of the interval they had selected.[12] Here, as with the job involvement scores, SM scores were averaged over squad members to provide a time-with-squad-leader (TSL) score for the squad as a whole. Mean TSL scores at Time 1 (n=49) and Time 2 (n=49) were 4.4 and 8.0 months, respectively. We then divided the 49 Time-1 TSL scores into two (Low TSL and High TSL) groups, using as close to a median split as possible.[13] Mean TSL scores for the Time-1 "low" (n=19) and "high" (n=20) groups were 2.0 and 10.0 months respectively. Corresponding scores for these groups at Time-2 were 5.8 and 13.3 months respectively.[14]

Same-vs-different SL. It was suggested earlier that if there is indeed a correlation between SM and SL job involvement, and if this correlation increases over time with continuing SM-SL interaction, we would be able (at least tentatively) to attribute the correlation to processes associated with the interaction between/among the individuals involved. An observed correlation of this sort would imply that these interpersonal processes are specific to the interacting individuals and that no such correlation would be found if SMs were paired with randomly selected SLs--i.e., with SLs with whom the SMs had not interacted. We thought it useful in the present instance to

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[12] The 10th alternative, "36 months or more", was viewed (like the others) as a 4-month interval and was coded as "37.5 months".

[13] There were 10 scores at the median, leaving us with the choice either of using a grossly lop-sided comparison (29 vs 20 or 19 vs 30) or dropping these 10 scores and reducing the sample from 49 to 39. We decided on the latter.

[14] Mean number of months between Time-1 and Time-2 measures was slightly different for the "low" (n=19) and the "high" (n=20) TSL groups. The reason for this difference is that the relevant figures were obtained from respondents' estimates, both at Time 1 and at Time 2, as to how long they had been with their SL. Estimates at Time 2, as well as estimates at Time 1, doubtless include a certain amount of respondent error.

obtain data on this question directly; and, to provide these comparison data, we correlated SM scores with the scores of randomly selected SLs from other platoons.[15] Six such correlations were computed at Time 1, and six more were computed at Time 2; and for each time period the mean of the six correlations was computed.

RESULTS

Inspection of overall means indicated that job involvement was lower at Time 2 than at Time 1, and this was the case both for SLs and for SMs. For SLs, mean job involvement was 4.14 at Time 1 and 3.95 at Time 2 (t=2.93, df=48, p<.01). For SMs, it was 3.69 at Time 1 and 3.56 at Time 2 (t=2.54, df=48, p<.05)[16]. The means are displayed in Table 2.

Overall Correlation of SM-SL Job Involvement

At Time 1 the correlation of paired SM and SL job involvement scores was .10 (NS), while at Time 2 it was .34 (p<.01). By contrast, correlations of SM scores at Time 1 with scores of six randomly-selected SLs ranged from -.23 to .16, with a mean -.04. (all ps>.05). Corresponding correlations at Time 2 ranged from -.21 to .10, with a mean of .05 (all ps>.05). The coefficients are displayed in Table 3.

SM Time with Squad Leader

With respect to the Time-1 subsamples, in those cases (n=19) where SMs had been with their SL for the shorter period (on average, 2.0 months) the SM-SL correlation was -.23 (NS). In those cases (n=20) where SMs had been with their squad leader for the longer period (on average, 10.9 months) the SM-SL correlation was .39 (p<.05). With respect to the Time-2 subsamples, in those cases where SMs had been with their squad leader for the shorter

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[15] There are various ways of going about this. For example, in selecting an SL for the "different-SL" comparison we might have chosen SLs from a different squad in the same platoon, a different platoon in the same company, a different company in the same battalion, a different battalion in the same brigade, or from some variation of these. Preliminary analyses had shown that there was a degree of motivational similarity within platoons; and we decided therefore to select our "different" SLs from platoons other than the ones to which they were assigned and to do this in a random fashion, ignoring the matter of possible similarity/dissimilarity of company and battalion.

[16] t test for correlated means

period (on average, 5.7 months) the SM-SL correlation was .19 (NS). With respect to the Time-2 subsamples, in those cases where SMs had been with their SL for the longer period (on average, 13.3 months) the SM-SL correlation was .59 ($p<.01$).

Table 2.
Mean Job Involvement, Shown Separately by Respondent Position and Time of Questionnaire Administration

	Time of Questionnaire Administration		
Respondent Position	TIME 1	TIME 2	DIFFERENCE
SQUAD MEMBER (N=49)[a]	3.69	3.56	-.13*
SQUAD LEADER (N=49)	4.14	3.95	-.19**
OVERALL MEAN	3.91	3.76	

a These are squad means. Total N is 190.
* p<.05
** p<.01

Table 3.
Correlation of SM and SL Job Involvement at Time 1 and Time 2

	Time of Questionnaire Administration	
	TIME 1 (N=49)	TIME 2 (N=49)
SMs with own SL	.10	.34**
SMs with randomly-selected other SL	-.04[a]	-.05[a]

** p<.01
[a] Mean of six correlations

As a way of highlighting the relationship between TSL and the magnitude of the SM-SL correlation, we arranged the four correlations in rank order according to the duration of the SM-SL relationship associated with that correlation. The coefficients of these correlations are shown in rank order in Table 4. As can be seen, the two sets of rankings are identical: The greater the duration of the SM-SL relationship, the greater the correlation between their self-reported job involvement scores.

Table 4.
Ordered Length of SM-SL Relationship in Four Subsets and the Coefficient of SM-SL Job Involvement Correlation in Each Subset

SUBSET	LENGTH OF SM-SL RELATIONSHIP (In Months)	COEFFICIENT OF SM-SL JOB INVOLVEMENT CORRELATION
1. (*n*=19)	2.0	-.23
2. (*n*=19)	5.8	.19
3. (*n*=20)	10.0	.39*
4. (*n*=20)	13.1	.59**

* $p<.05$
** $p<.01$

SM Perceptions

Given the indicated correlations between job involvement of SMs and their SLs, we sought evidence as to the characteristics of SLs who were involved in the higher SL-SM correlations as distinguished from SLs who were involved in the lower SL-SM correlations. Using the procedure described earlier for dividing SMs into low vs high TSL, we created low and high SM groups at Time 2 for each of the following variables: Horizontal Bonding (4-item scale), Platoon Pride (2-item scale), Organizational Identification (4-item scale), Perception of SL's Ability to Motivate Subordinates (4-item scale), Perception of SL's Team Development Ability (5-item scale), Perception of SL's Communication Ability, and 4 items from a scale measuring SM's

Perception of SL's Overall Leadership Ability.[17] The question we asked here was whether the previously-observed SM-SL correlation was higher in cases where SMs attributed high ability to their SL than in cases where the SM attributed low ability.

Of the several sets of variables examined, only one discriminated clearly between low and high SM-SL correlations. This was the set of 4 items measuring SMs' perception of their SL's overall leadership ability. Consistently, SM-SL job involvement correlations were higher where SMs viewed their SL as being conscientious, someone in whom they would have confidence if they were in combat together, someone who pulled his share of the load while in the field, someone who was an overall effective leader. The four items, and the SM-SL correlations associated with them, are shown in Table 5.

[17]These scales and their psychometric characteristics are described in Tremble and Alderks (1992).

Table 5.
Correlation of SM and SL Job Involvement, Shown Separately by How SMs Judge Their SL on Specified Characteristics

	How SMs Judge Their SL on Specified Characteristics	
	LOW (ns: 17-20)	HIGH (ns: 17-21)
Characteristic		
MY SQUAD LEADER. . .		
1. Works hard and tries to do as good a job as possible. . . .	.09	.66***
2. Pulls his share of the load in the field . . .	.27	.45*
3. Would have my confidence if we were in combat together. .	.31	.53**
4. Is an effective leader	.29	.54**

* $p<.05$
** $p<.01$
*** $p<.001$

Directionality

We next sought evidence as to directionality of the SM-SL relationship. We examined differential Time-1/Time-2 change by SMs and their SLs for evidence on the question of who changed more during the period--the SMs or their SLs. Mean absolute change for SMs was .29, and for SLs it was .36. Both these change scores are significant (*p*s<.01), but the difference between them was small and not significant (*p*>.05).[18]

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[18] We also examined a second set of data, differences in SM-SL Time-1/Time-2 cross-lag correlations (Locascio, 1982), for necessary (though not sufficient) evidence of causality. (cf Biddle, Slavings, & Anderson, 1985). Separate cross-lag correlations were computed at Time 1 for SMs and their matched SLs who had worked together for a shorter vs a longer period of time, and the same was done at Time 2. Looking first at the data from the two (Time 1 and Time 2) shorter periods, SM scores at Time 1 correlated .01 with SL scores at Time 2; and SL scores at Time 1 correlated -.10 with SM scores at Time 2. Neither of these correlations was significant. Looking then at the data from the two (Time 1 and Time 2) longer periods, SM scores at Time 1 correlated .31 (p>.05) with SL scores at Time 2; and SL scores at Time 1 correlated .43 (*p*<.05) with SM scores at Time 2. As indicated above, SM-SL correlations for the longer periods were .39 at Time 1 and .59 at Time 2. The data from the cross-lag correlations are thus in the direction of greater change by SMs than by SLs. Unfortunately, some of the statistical assumptions for such an analysis proved not to be tenable; and, because of this fact, the results are difficult to interpret.

SUMMARY, CONCLUSIONS, AND DISCUSSION

Summary

Major findings may be summarized as follows:

1. While SM and SL job involvement were not significantly correlated at Time 1, they were significantly correlated at Time 2 (some 3-4 months later).

2. While this correlation was not significant for SLs and SMs who had worked together for a relatively short period, it was significant for SMs and SLs who had worked together for a longer period--both at Time 1 and at Time 2.

3. The magnitude of the SM-SL correlation exhibited a perfect rank-order correlation with the number of months that SLs and their SMs had worked together.

4. When SM scores were correlated with scores of SLs with whom the SMs had not interacted, the coefficient was approximately zero--both at Time 2 and at Time 1.

Conclusions

These findings provide support for the following conclusions (given the conditions to which the SLs and their SMs were exposed):

1. When SLs and their SMs work together over a period of time, there tends to be a kind of "motivational contagion", such that the degree of job involvement of one affects the degree of job inolvement of the other.

2. The longer SLs and their SMs work together, the greater the probability this effect will appear.

3. There may be some minimum period required for this "contagion" of job involvement to take place.

Discussion

1. The data in Table 4 (showing the rank ordering of SM-SL correlations to be perfectly correlated with the rank ordering of the number of months SMs and their SL had worked together) can be interpreted in at least two ways. The more conservative interpretation focuses on the estimated reliability of the

observed correlations and makes no assumptions about their magnitude. According to this interpretation, interpersonal influence or contagion regarding job involvement does not take place until the SMs and their SLs have worked together for a significant period of time (perhaps ten months and possibly even longer). A less conservative interpretation focuses also on the magnitude of the observed correlations. According to this interpretation, almost any amount of SM-SL interaction results in some influence; and additional interaction results in additional influence. Thus, according to this interpretation, some influence is exerted when SMs and their SL have worked together for a relatively short period (perhaps six months); more influence is exerted when they have worked together for an additional period; and still more influence is exerted when they have worked together for a longer period still. The available data do not allow us to choose between these two interpretations, but both interpretations accept the following as true: The correlations computed from SMs and SLs who had worked together at least ten months meet conventional standards of statistical reliability, whereas correlations computed from SMs and SLs who had worked together for a shorter period did not meet this standard.

2. The more similar SMs and their SL were to each other in their self-reported job involvement the more likely these SMs were to attribute to their SL leadership traits that were highly positive. Thus, SMs who described themselves as trying to do as good a job as possible (etc.) and whose SL described himself in a similar fashion--these SMs were more likely than other SMs to say they would feel confident if they were in the field with their SL. As to which factors were causal or antecedent, however, the available data do not allow us to say.

3. The analyses focusing on directionality showed that the higher SM-SL correlation at Time 2 resulted from changes both by SMs and by SLs. The analysis of absolute change by SMs and their SLs between Time 1 and Time 2, while showing somewhat greater change by SLs, found the difference to be statistically nonsignificant. Analysis of the relevant cross-lag correlations, while potentially useful, was in the present situation difficult to interpret due to the fact that relevant data fail to meet certain assumptions. Additional data will be needed to answer the directionality question.

4. The generally bi-directional nature of the influence or contagion observed here does not mean that motivational influence between leaders and subordinates is always bi-directional. It is entirely possible that, at higher levels or with leaders whose position is more than one level higher than that of the subordinates in question, motivational influence would be stronger in one direction.

5. Although it does not surprise us that SLs and their SMs may have influenced one another in the process of living and working together over a period of time, these data do not tell us how or why this influence took place or what social-psychological processes were involved (cf Becker, 1992).

6. The overall data show a downward trend in job involvement scores over time, both for SLs and for SMs. Scores of SLs were, not surprisingly, higher than scores of SMs; but between Time 1 and Time 2 their scores came down more. This trend could be due to statistical regression (in which case the trend would be simply an artifact of the measurement situation), or it could be due to environmental factors (in which case the trend would have to be viewed as real). The available data, unfortunately, do not allow us to say which of these explanations (or how much of either) is true.

7. The question might be asked whether this downward trend in SL and SM scores could have played a part in the higher SM-SL correlations observed at Time 2 and, if so, provide a more parsimonious explanation for the observed correlations than the explanation advanced here. There are at least two reasons for believing this was not the case. In the first place, the correlations observed at Time 2 were not the only correlations that supported the hypotheses of this research. Supporting data come from several sources, including the data obtained at Time 1, and data obtained at Time 1 cannot have been affected by factors specific to Time 2. In the second place, the effect of any such regression or regression-like phenomenon would be to reduce score variability and thus artifactually prevent an observed correlation from being as large as it might otherwise be. What is suggested by this interpretation is that the SM-SL correlations observed at Time 2 may in reality be larger than the ones that were computed.

8. The data do not tell us how much of the observed motivational influence was positive and how much of it was negative--only that SMs and their SL became more similar in their self-reported job involvement over time. Given that there was an overall downward trend of scores during the exercise, a negative change score could mean simply that positive influence from the SL enabled the SL's SMs to resist negative forces that otherwise would have pushed their score even lower (or vice versa).

9. It is possible that the SM-SL correlations observed in this research were due to factors external to the SM-SL relationship. For example, if the job involvement of the PSGT were particularly salient to the SMs (as well as the SL), and if the interpersonal relationship with that PSGT were particularly important for the SMs (as well as the SL), SM and SL job involvement scores could end up being correlated positively--not because SMs and their SLs were influencing each other but because they were (independently)

being influence by a third person. The available data (especially the *n*s for the relevant subsamples) are not adequate for testing this hypothesis. Given, however, the wide acceptance of the view that interacting individuals influence each other, often in very subtle ways (cf Merton, 1957, p. 250-258), plus the data provided by the present research, it seems likely that if the SM-SL correlation had external sources, these sources were supplementary at best. We hope to be able to answer these and other questions in future research.

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APPENDIX A

Nature and Source of Data

Background. During 1989-90, ARI collected data from four companies in each of five battalions. These units had been scheduled for training (and subsequently were trained) at one of the Army's two stateside combat training centers (CTCs)--either the National Training Center (NTC) at Ft. Irwin, California, or the Joint Readiness Training Center (JRTC) at Ft. Chaffee, Arkansas--and arrangements were made for ARI to collect data at the homestation of each unit. In accordance with the previously-developed schedule, data were collected in each of these units several months prior to the unit's going to the CTC ("baseline measurement") and again shortly before the unit left for the CTC ("pre-rotation measurement"), and questionnaires were administered to some 1200-1300 soldiers each of these occasions. Commanders had been asked to send "the same units" to the baseline and pre-rotation questionnaire sessions (a phrase usually interpreted to mean "as many soldiers from as many of these units as can be made available"). Thus with regard to individual soldiers, there was not a great deal of overlap between baseline and pre-rotation samples, although there was some. For example, there were 634 squad members who were in the same platoon on both occasions and who provided data both times (though 184 of these squad members had moved to a different squad). Similarly, there were 61 squad leaders who were in the same platoon and provided data on both occasions (though 10 of these squad leaders had moved to a different squad). In the present report these two data collection occasions are for simplicity referred to as "Time 1" and "Time 2".

The questionnaires included items on a variety of topics (e.g., job involvement, CTC motivation, job satisfaction, leadership style, unit cohesion) and were administered to individuals at four levels, including squad members (SMs) and squad leaders (SLs). The method of administration and the scales that were constructed are described in Tremble and Alderks (1992).

The first step was to design a repeated-measure data set for use in the present analysis as well as any follow-up analyses we might do with leaders at other position levels. One of the things needed was a subsample of individuals, all of whom could be precisely identified with respect to their lowest unit of identification. Squad leaders and squad members had to be identifiable by squad, and platoon sergeants and platoon leaders had to be identifiable by platoon. Individuals not precisely identifiable in this way were dropped from the subsample. (Altogether, approximately 100 individuals were dropped because this information was not found in the original data set.)

Starting from this narrowed sample we created several subsamples including the one used in the analysis reported here--viz., those individuals (SMs and SLs) who were assigned to the same squad at Time 1 and at Time 2 and who had provided data on both occasions. Shown below are (a) position Ns for SMs and SLs in the original data set, (b) corresponding ns for the (COMMON) data set used in the present analysis, and (c) percentage of the original set included in the COMMON subsample. As can be seen, the Common data set included 48% of the SMs and 28% of the SLs in the original data set.

	(a) ORIGINAL DATA SET N=	(b) COMMON DATA SET n=	(c) PERCENTAGE OF ORIGINAL
Position			
SM	1330	634	48
SL	219	61	28

APPENDIX B

Statistical/Conceptual Note

One of the questions we faced was how best to match the two variables, X and Y, in computing a correlation between them when, for a given X (job involvement of the SL) there was only one score but for the corresponding Y (job involvement of the members of the SL's squad) there were two or more scores. One solution would have been to draw a random sample of n=1 from each squad and then pair that randomly-drawn SM with the SL of that squad. Doing this would have produced for each squad a pair of individuals, an SM and the SM's SL, whose scores could be correlated with each other. But given the high variability of the SMs and the relatively small number of individuals available for the research, using this procedure would have been unacceptably wasteful of resources. A second possibility was to use a summary statistic (e.g., the arithmetic mean of SM scores in a given squad) and correlate that summary statistic with the individual score obtained from the SL. This procedure involves a number of uncertainties the most obvious of which is that, as a summary statistic, it ignores the variability of scores on which the statistic is based. And since the magnitude of a coefficient of correlation is a function of both the between-X scores and the between-Y scores, to ignore the within-group variability of one of the variables (here, within-squad variability) runs the risk of distorting (either inflating or reducing) the magnitude of the obtained coefficient of correlation--a condition that James (1982) refers to as "aggregation bias". We anticipated, however, that (as a result of breaking the sample down, not just once but several times, into theoretically-relevant subsamples) we would be examining not just one but several different coefficients. If each of these coefficients provided essentially the same information, we would have a basis for believing either (a) that the distortions were not serious or (b) that positive and negative effects had balanced each other out--in either case, however, not constituting a serious problem for the interpretations to be made of these coefficients.